

- firm's stock, financial analysts want to discount this liability back to the present. If the relevant discount rate is 7.4 percent, what is the present value of this liability?
11. **Calculating Present Values [LO2]** You have just received notification that you have won the \$1 million first prize in the Centennial Lottery. However, the prize will be awarded on your 100th birthday (assuming you're around to collect), 80 years from now. What is the present value of your windfall if the appropriate discount rate is 10 percent?
12. **Calculating Future Values [LO1]** Your coin collection contains fifty 1952 silver dollars. If your grandparents purchased them for their face value when they were new, how much will your collection be worth when you retire in 2057, assuming they appreciate at a 4.5 percent annual rate?
3. **Calculating Interest Rates and Future Values [LO1, 3]** In 1895, the first U.S. Open Golf Championship was held. The winner's prize money was \$150. In 2007, the winner's check was \$1,260,000. What was the percentage increase per year in the winner's check over this period? If the winner's prize increases at the same rate, what will it be in 2040?
4. **Calculating Interest Rates [LO3]** In 2008, a gold Morgan dollar minted in 1895 sold for \$43,125. For this to have been true, what rate of return did this coin return for the lucky numismatist?
5. **Calculating Rates of Return [LO3]** Although appealing to more refined tastes, art as a collectible has not always performed so profitably. During 2003, Sotheby's sold the Edgar Degas bronze sculpture *Petite Danseuse de Quatorze Ans* at auction for a price of \$10,311,500. Unfortunately for the previous owner, he had purchased it in 1999 at a price of \$12,377,500. What was his annual rate of return on this sculpture?
6. **Calculating Rates of Return [LO3]** Referring to the TMCC security we discussed at the very beginning of the chapter:
- Based on the \$24,099 price, what rate was TMCC paying to borrow money?
  - Suppose that, on March 28, 2020, this security's price is \$38,260. If an investor had purchased it for \$24,099 at the offering and sold it on this day, what annual rate of return would she have earned?
  - If an investor had purchased the security at market on March 28, 2020, and held it until it matured, what annual rate of return would she have earned?
7. **Calculating Present Values [LO2]** Suppose you are still committed to owning a \$170,000 Ferrari (see Problem 9). If you believe your mutual fund can achieve a 12 percent annual rate of return and you want to buy the car in 9 years on the day you turn 30, how much must you invest today?

**the Number of Periods [LO4]** At 7 percent interest, how long does it take your money? To quadruple it?

**Interest Rates [LO3]** In January 2007, the average house price in the U.S. was \$314,600. In January 2000, the average price was \$200,300. What is the annual increase in selling price?

**the Number of Periods [LO4]** You're trying to save to buy a new car. You have \$40,000 today that can be invested at your bank. The bank offers a 3 percent annual interest on its accounts. How long will it be before you have enough to buy the car?

**Present Values [LO2]** Imprudental, Inc. has an unfunded pension liability of \$650 million that must be paid in 20 years. To assess the value of the liability, a financial analyst wants to discount this liability back to the present. If the discount rate is 7.4 percent, what is the present value of this liability?

**Present Values [LO2]** You have just received notification that you have won the \$1 million first prize in the Centennial Lottery. However, the prize must be received on your 100th birthday (assuming you're around to collect), 75 years from now. What is the present value of your windfall if the appropriate discount rate is 10 percent?

**Future Values [LO1]** Your coin collection contains fifty 1952 silver dollars. Your grandparents purchased them for their face value when they were young. How much will your collection be worth when you retire in 2057, assuming an annual rate of 4.5 percent annual rate?

**Interest Rates and Future Values [LO1, 3]** In 1895, the first U.S. national championship was held. The winner's prize money was \$150. In 2007, the prize money was \$1,260,000. What was the percentage increase per year in prize money? If the winner's prize increases at the same rate, what will the prize be in 2040?

18. **Calculating Future Values [LO1]** You have just made your first \$4,000 contribution to your retirement account. Assuming you earn an 11 percent rate of return and make no additional contributions, what will your account be worth when you retire in 45 years? What if you wait 10 years before contributing? (Does this suggest an investment strategy?)

19. **Calculating Future Values [LO1]** You are scheduled to receive \$20,000 in two years. When you receive it, you will invest it for six more years at 8.4 percent per year. How much will you have in eight years?

20. **Calculating the Number of Periods [LO4]** You expect to receive \$10,000 at graduation in two years. You plan on investing it at 11 percent until you have \$75,000. How long will you wait from now?